

Boosting Investment in Scientific Research: An Important Tool for Post-COVID 19 Economic Recovery Readiness and for Meeting Future Challenges

Submission to the Finance Committee's Pre-Budget Consultations

Prepared by:

The Canadian Society for Molecular Biosciences (CSMB)

RECOMMENDATIONS

That the Government commit to appropriately funding Canada's best and brightest in science and research, by:

Recommendation 1: That the Government significantly increase investment in current models and mechanisms of science and discovery research by 25%. This number was arrived at by the Science Review expert panel in 2017, the most comprehensive review of federal support for fundamental science in 40 years.

Recommendation 2: That the Government increase investment in training of the next generation of scientists, over 4 years, to an additional \$140M per year (increases at \$35M per year, via the tri-councils).

Recommendation 3: That the Government increase its investment in the Research Support Fund, over 4 years, to an additional \$478M to help institutions across Canada to support their researchers as effectively and efficiently as possible.

Recommendation 4: That the Government increase investments to support investigator- initiated fundamental research at CIHR, NSERC and SSHRC by increased investments into the granting councils.

Conceived in 1957, the **Canadian Society for Molecular Biosciences (CSMB)** is a professional association of scientists involved in Biochemistry, Cell Biology, Molecular Biology and Genetics. Our members are primarily from universities and academic research institutions from across the country and are the scientists responsible for investigator-driven research. Their work generates new knowledge that fuels innovation and discoveries, and trains the next generation of scientists who will continue to innovate and contribute to our knowledge-based economy through academic, industry, and business opportunities.

On behalf of the CSMB, we would like to thank the Finance Committee for the opportunity to provide our recommendations for Federal Budget 2022. Alongside the rest of Canada's scientific community, we are calling for significant and sustained investments in science and discovery research, so that we can continue to recover from the COVID-19 pandemic, as well as build a better and more resilient tomorrow.

The Impact of Sustained Support for Science and Research, Illustrated by the Pandemic

As Canada continues to cope with the challenges brought on by the pandemic, science, undertaken by Canadian scientists, has been a guiding light of hope amid the darkness of a difficult year. Through immense cross-disciplinary collaboration and a spirit of scientific ingenuity, Canada's scientific community, including CSMB, has risen to the challenge. For example, CSMB's Past-President (and current Vice-Chair, Research Canada), Tarik Möröy, (Scientific Director at the Montreal Clinical Research Institute) led his team of researchers from to establish COVID-19 clinical trials, an antibody screening system, and a Level 3 containment lab to test COVID-19 antivirals. Current CSMB President, Dr. Imogen Coe, is working with ScienceUpFirst, a national initiative of scientists and researchers, to challenge health misinformation and convey the most accurate science information to Canadians across multiple platforms.

But as the light at the end of this pandemic appears brighter everyday, it is vital for us to consider the foundational work that has produced the pandemic-ending scientific achievements, and how COVID-19 has shifted Canada's science policy landscape, as well as that of our competitors.

Canada's world-leading vaccination campaign has been underpinned by ground-breaking mRNA vaccines – a breakthrough enabled by discoveries made from basic research in many labs through collaborative research efforts of student researchers and established scientists over the past 60 years. The future impacts and relevance of fundamental research discoveries are rarely obvious at the time of the research but rather contribute to a growing body of knowledge that is sustained and nourished with appropriate resources and ongoing investment. Government investment in scientific research has been especially highlighted in the past year as public dollars played an essential role in getting vaccine research, development and manufacturing off the ground, based on decades of research that allowed this leap. The pandemic illustrated the necessity of supporting fundamental research on an ongoing basis, and the ability to apply that

research to new and emerging challenges quickly, which would not be possible without the existing groundwork.

The Need to Increase Support for Science and Research: An Investment in our Long-Term Future

This pandemic has created challenges for Canadians, including many scientists and their research teams, who are dependent on federal funding and who are training the next generation of innovators to tackle the next crisis. Resources shifted rapidly to focus on understanding the virus and addressing its impact. While our ability to quickly mobilize funds and skilled workers for research related to COVID-19 helped our response, other important research (into the many other health challenges faced by Canadians such as diabetes and cancer) have slowed. This has led to concerns in Canada's research community on the potential negative impacts the pandemic could create on Canadians' health because of research gaps. The pandemic has highlighted the necessity of a sufficiently funded scientific community that is sustained at a high level over the long-term across a breadth of areas.

Momentous change has been the biggest constant of the 21st century, and nowhere is that more evident than with climate change. From flash flooding to increasingly devastating forest fires, the climate crisis has become a leading threat to our shared economic and ecological future. Solving this crisis will be one of the great challenges of our lifetimes, and investing in science is the key to getting there. From large-scale renewable energy generation to carbon capture and storage, scientific innovations, which always start with basic research, can pave the way to a safe climate future - but only if investments are made to realize this potential.

Why fund science? Investments in science and research lead to:

Healthier Canadians, through the creation of new knowledge through basic and applied research and a greater understanding of ourselves, our health, our biology and why sometimes things go wrong.

Healthier Canadians, through the discovery of new treatments and therapies, as well as vaccines, highlighted by the pandemic.

More employed Canadians and more high-quality careers for diverse applications, with the vast majority of research scientists being trained in academic science research teams that are funded by federal research funding.

A more competitive Canada, with the ability to attract industry investment, and support the commercialization of new discoveries.

A better standard of living and quality of life, as an investment in human capital helps to support and sustain our high standard of living and quality of life.

Canada's allies and competitors have taken note of these pandemic learnings, challenges and emerging science policy realities, and this is best embodied by the commitments of the new Biden administration. The new President's first budget request to Congress reflects his administration's broad, bold and ambitious science and research agenda – proposing a 10% (\$4.4B USD) increase in basic research funding, a 21% (\$11B USD) increase to the National Institutes of Health (NIH) budget, and a 16% National Science Foundation budget increase to expand its education and workforce training programs and support next-generation science talent[1]. The United States is one of several countries that has identified science and research as a way out of the pandemic, and has matched this with adequate funding.

At the same time, while billions of dollars of new investment have indeed been pouring into the Canadian biotech and life-sciences sector as of late, including through commitments from Federal Budget 2021, “with investment flowing, the missing link isn't money but talent.... Canada simply isn't developing, recruiting and retaining enough senior talent to leverage these new investments. We need to identify, train and win over a new generation of leaders and specialized scientists who can scale these promising start-ups into global powerhouses”[2].

The government's newly released Biomanufacturing and Life Sciences Strategy is a step in the right direction, with its focus on bio-science infrastructure through building up post-secondary and hospital research capacity, investment funds for industry to scale-up bio-science ventures, and support for national science agencies. However, it is vital for any government strategy to retain a laser focus on this significant hurdle for the sector: a lack of support for next-generation science talent leads to a skills shortage, which is incredibly problematic for a sector that is so highly skilled.

As the pandemic highlighted the need for a highly skilled workforce with a background in biosciences – which feeds into the fields of epidemiology, virology, vaccine development, public health, pharmaceutical innovation, and more – is more important than ever, and Government action is needed to ensure that we have enough qualified Canadians to meet the needs of a rapidly growing sector.

To ensure that Canada can also act on the lessons learned from the pandemic, and be adequately prepared to meet future challenges, the CSMB recommends that the Government commit to appropriately funding science and research by:

Recommendation 1: That the Government significantly increase investment in current models and mechanisms of science and discovery research by 25%. This number was arrived at by the Science Review expert panel in 2017, the most comprehensive review of federal support for fundamental science in 40 years.

This investment would address the steady decline in research funding in Canada thereby positioning Canada to innovate and discover on the global stage, promote greater international collaboration, create interdisciplinary opportunities, and lead to high-risk ventures that will ensure Canada is ready to face the next global health challenges ahead.

Recommendation 2: That the Government increase investment in training of the next generation of scientists, over 4 years, to an additional \$140M per year (increases at \$35M per year), through the tri-councils.

As posited in the Council of Canadian Academies report, Powering Discovery[3], “cultivating a robust, resilient, and diverse scientific workforce is central to the development of a nation’s research capacity and requires supporting researchers throughout their careers”. A commitment to training the next generation of scientists will ensure Canada retains its best and brightest and not run the risk that our investments leave Canada for better opportunities.

Recommendation 3: That the Government increase its investment in the Research Support Fund, over 4 years, to an additional \$478M to help institutions across Canada to support their researchers as effectively and efficiently as possible.

Cutting-edge discovery research such as the Canadian scientific teams searching for a COVID-19 vaccine, takes place in universities, hospitals and research institutes across the country and their infrastructure is increasingly in need of upgrades. Our scientists require state of the art infrastructure to continue to innovate, discover and create new knowledge.

Recommendation 4: That the Government increase investments to support investigator-initiated fundamental research at CIHR, NSERC and SSHRC by increased investments into the granting councils.

The current level of operational support at the tri-councils is insufficient to support Canadian researchers at internationally competitive rates. The erosion of the funding base has been slowly forcing many promising biomedical research laboratories across the country to reduce their

research efforts or close entire research programs, release highly trained personnel, and stop training the next generation of scientists. This fundamentally threatens our preparedness for the next pandemic since basic science training is foundational to so many aspects of public health, medicine and biomedical research into therapies.

Canada's scientists have been at the forefront of the response to COVID-19. Because of the investments that have been made by governments, both provincial and federal, to support the scientific community thus far, Canada has fared better than it otherwise would have. A commitment to basic science helped us to understand and apply knowledge to the problems Canadians faced, such as the novel vaccines developed over the past year. Similarly, a sustained commitment and investment in basic science will help us to understand the root causes of many other problems that Canadians face, or might face in the future – diseases like cancer, diabetes, dementia, and challenges such as climate change, natural disasters, antibiotics resistance and contaminated drinking water, to name only a few.

[1] <https://www.sciencemag.org/news/2021/05/biden-seeks-big-increases-science-budgets>

[2] <https://www.marsdd.com/news/canadas-biotech-and-life-sciences-sector-needs-an-infusion-of-talent-to-scale/>

[3] https://www.cca-reports.ca/wp-content/uploads/2021/05/Powering-Discovery-Full-Report-EN_DIGITAL_FINAL.pdf